

ABSTRACT

A magnetic resonance imaging apparatus is provided. The magnetic resonance imaging apparatus includes a main magnet assembly for generating a main magnetic field in a main magnetic field direction in an examination region, a gradient coil assembly for generating magnetic gradient fields in the main magnetic field within the examination region, a radio frequency transmit coil assembly for exciting resonance in selected dipoles within a subject disposed in the examination region such that the dipoles generate circularly polarized resonance signals at a characteristic resonance frequency, a radio frequency receive coil assembly for receiving the circularly polarized resonance signals generated by the dipoles, and a reconstruction processor for reconstructing the received signals into an image representation. The radio frequency receive coil assembly is disposed in the examination region substantially perpendicular to the main magnetic field direction and includes a substantially planar substrate and an array of quadrature coils disposed on the substrate. Each quadrature coil includes a first loop portion disposed on a first surface of the substrate and a second loop portion disposed on a second surface of the substrate.